AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1.(Original) A communication unit for a multiple code rate communication system comprising:

a codeword defining N codeword elements and K information elements coded at a code rate $R=K/(N-P)$, wherein P is a number of punctured elements of the codeword;

a first storage location for storing an error reduction code mother code;

a second storage location for storing a maximum puncture sequence S_{max}, wherein S_{max} is the puncture sequence for a maximum code rate R_{max}, and further wherein S_{max} comprises a subset S_1 that is a puncture sequence for a minimum code rate R_1.

2.(Original) The communication unit of claim 1 wherein the unit is one of a transmitter that outputs the codeword or a receiver that receives the codeword.

3.(Original) The communication unit of claim 1 wherein $S_{max}=S_{N-K}$.

4.(Original) The communication unit of claim 1 wherein S_{max} further comprises at least two subsets S_i that is a puncture sequence for a code rate R_i, wherein i is an integer greater than or equal to one and each sequentially higher i^{th} code rate is higher than the sequentially lower i^{th} code rate.

5.(Original) The communication unit of claim 4 wherein each S_i comprises at least one memory element, and each S_i with at least two memory elements has at least one memory element in common with another S_i and with S_{max}.

6.(Original) The communication unit of claim 4 wherein $S_1 \subseteq S_2 \subseteq \ldots \subseteq S_{max-1} \subseteq S_{max}$.

7.(Original) The communication unit of claim 1 wherein the second storage location comprises a plurality of memory elements for storing S_{max}, each memory element storing a variable degree.

8.(Original) The communication unit of claim 1 wherein the second storage location comprises a plurality of memory elements for storing S_{max}, each memory element storing a variable node location.

9.(Original) The communication unit of claim 1 wherein the second storage location comprises a plurality of memory elements for storing S_{max}, each memory element storing one of a variable degree, a check degree, a variable node location, or a check node location.

10.(Original) The communication unit of claim 1 wherein the error reduction code mother code is a low-density parity-check (LDPC) mother code.

11.(Original) A transceiver for transmitting and receiving a codeword at any of three coding rates R_1, R_2 and R_3, wherein the codeword defines N codeword elements, K information elements, and P punctured elements, and the coding rates $R_1=K/(N-P_1) < R_2=K/(N-P_2) < R_3=K/(N-P_3)$, comprising:

a transmitter, a receiver, and storage for storing a low-density parity-check (LDPC) mother code;

a plurality of memory elements that in combination store a puncture sequence S_3 that corresponds to R_3;

a first set of computer instructions for retrieving a first subset of the plurality of memory elements to yield a puncture sequence S_1 that corresponds to R_1; and

a second set of computer instructions for retrieving a second subset of the plurality of memory elements to yield a puncture sequence S_2 that corresponds to R_2.

12.(Original) A computer program embodied on a computer readable medium for determining a puncture sequence for a codeword, comprising:

a first storage location for storing a low-density parity-check (LDPC) mother code;

a second storage location for storing a plurality of memory elements M_{all} that in combination comprise a maximum rate puncture sequence S_{max} that corresponds to a maximum code rate R_{max}; and

a first set of computer instructions for reading a first subset of memory elements M_{set1}, wherein the number of M_{set1} is less than the number of M_{all}, wherein M_{set1} comprises a puncturing sequence S_1 that corresponds to a code rate $R_1 < R_{max}$.

13.(Original) The computer program of claim 12 further comprising a second set of computer instructions for reading a second subset of memory elements M_{set2}, wherein the number of M_{set2} is greater than the number of M_{set1}, wherein M_{set2} comprises a puncturing sequence S_2 that corresponds to a code rate $R_2 > R_1$, and further wherein at least one memory element is a memory element of both M_{set1} and M_{set2}.

14.(Original) A method for determining a puncture sequence for an ensemble of low-density parity-check (LDPC) codes comprising:

selecting at least one design criteria for an ensemble of LDPC codes and a stop criteria;

calculating a mean input LLR values, m_{u_0}, that achieves the design criteria on the ensemble of codes;

selecting a variable degree j within the design criteria for puncturing that requires one of a smallest mean input LLR value or a smallest decoding complexity;

appending the variable degree to the puncturing sequence;

adjusting the puncturing probability for the punctured variable degree, $\pi_j^{(0)}$; and

repeating the calculating and subsequent steps until the stop criteria is reached.

15.(Original) The method of claim 14 wherein adjusting the puncturing probability for the punctured variable degree, $\pi_j^{(0)}$ includes accounting for a specific code length and a finite number of variable nodes of each variable degree.

16.(Original) The method of claim 14 wherein the stop criteria comprises a code rate equal to one.

17.(Original) The method of claim 14 wherein the stop criteria comprises a length of a puncturing sequence that corresponds to a Binary Erasure Channel (BEC) threshold for random errors.

18.(Original) The method of claim 17 wherein the stop criteria comprises a fraction of punctured variable nodes that reaches or exceeds the BEC threshold.

19.(Original) The method of claim 14 wherein the at least one design criteria is selected from at least one of the group consisting of: a target bit error rate (BER) within a finite number of iterations; an asymptotic E_b/N_0 threshold; and a number of decoding iterations for a target BER.

20.(New) A transmitter comprising:

an information source for providing a codeword;

a memory for storing a low density parity check code LDPC mother code and a maximum puncture sequence S_{max};

a LDPC encoder having an input coupled to an output of the information source and an input coupled to an output of the memory; and

a modulator having an input coupled to an output of the LDPC encoder,

wherein the encoder operates in one instance to encode at a maximum rate R_{max} by puncturing elements of a codeword in locations described by the maximum puncture sequence S_{max} read from the memory, an in another instance to encode at a lesser rate R_1 by puncturing elements of a codeword in locations described by a subset S_1 of the maximum puncture sequence S_{max} read from the memory.

21.(New) The transmitter of claim 20, wherein the encoder encodes at any of rates R_{max}, R_3, R_2, and R_1 by puncturing elements of a codeword in locations described by the respective sequences S_{max}, S_3, S_2, and S_1, wherein $R_{max}>R_3>R_2>R_1$ and $S_1 \subseteq S_2 \subseteq S_3 \subseteq S_{max}$.

22.(New) The transmitter of claim 20, wherein the encoder encodes at any of rates R_{max}, R_3, R_2, and R_1 by puncturing elements of a codeword in locations described by the respective sequences S_{max}, S_3, S_2, and S_1, wherein $R_{max}>R_3>R_2>R_1$ and each of S_1, S_2 and S_3 are subsets of S_{max} but not subsets of any of the other of S_1, S_2 and S_3.

23.(New) A receiver comprising:

a demodulator for demodulating a received codeword;

a memory for storing a low density parity check code LDPC mother code and a maximum puncture sequence S_{max}; and

a LDPC decoder having an input coupled to an output of the demodulator and an input coupled to an output of the memory;

wherein the decoder operates in one instance to decode at a maximum rate R_{max} by de-puncturing elements of a codeword in locations described by the maximum puncture sequence S_{max} read from the memory, an in another instance to decode at a lesser rate R_1 by de-puncturing elements of a codeword in locations described by a subset S_1 of the maximum puncture sequence S_{max} read from the memory.

24.(New) The receiver of claim 23, wherein the decoder decodes at any of rates R_{max}, R_3, R_2, and R_1 by de-puncturing elements of a codeword in locations described by the respective sequences S_{max}, S_3, S_2, and S_1, wherein $R_{max}>R_3>R_2>R_1$ and $S_1 \subseteq S_2 \subseteq S_3 \subseteq S_{max}$.

25.(New) The receiver of claim 23, wherein the decoder decodes at any of rates R_{max}, R_3, R_2, and R_1 by de-puncturing elements of a codeword in locations described by the respective sequences S_{max}, S_3, S_2, and S_1, wherein $R_{max}>R_3>R_2>R_1$ and each of S_1, S_2 and S_3 are subsets of S_{max} but not subsets of any of the other of S_1, S_2 and S_3.